Duke DR1 to NCSEA, CCEBA, and SACE et al.
Docket No. E-100, Sub 165
2020 IRP
Item No. 1-1

Request:

Please provide all analyses, workpapers, assumptions, model inputs and outputs upon which Synapse Energy Economics, Inc. ("Synapse") relied upon or which support the "Mimic Duke" and "Reasonable Assumptions" scenarios modeled or analyzed in making any of the assertions in their report "Clean, Affordable, and Reliable A Plan for Duke Energy's Future in the Carolinas" (Exhibit A to your Partial Initial Comments on DEC and DEP's 2020 IRPs).

a. Please provide all Encompass input files and output files in electronic machine-readable formats as used by the Encompass model.
b. Please provide any outputs referenced in the Synapse report that are calculated outside of Encompass in electronic form with formulas in place.

Response:

The responsive documents are available at https://ncsea2018.sharepoint.com/:f:/g/policy/EsvhO_t-VCdHuYPVJ4r_g7oBQRP29RAkORFeiXVN5yjexQ?e=N38mCc in the folder entitled "Response to Duke DR1-1". Please note that the files named "GG Allen 1 hourly data export CONFIDENTIAL.xlsx" and "GG Allen 2 hourly data export CONFIDENTIAL.xlsx" contain information that Duke has marked as confidential.

In compiling this response, NCSEA, CCEBA, and SACE et al. observed a discrepancy in the modeling. NCSEA, CCEBA, and SACE et al. will be updating the Synapse report and will supplement its response once the updated report is filed.

TOTAL GENERATION CAPABILITY		
	WINTER CAPACITY (MW)	SUMMER CAPACITY (MW)
TOTAL DEC SYSTEM - N.C.	13,796.8	13,121.2
TOTAL DEC SYSTEM – S.C.	9,425.4	9,081.2
TOTAL DEC SYSTEM	23,222.2	22,202.4

NOTE a: Unit information is provided by State, but resources are dispatched on a system-wide basis.

NOTE b: Cliffside also called the Rogers Energy Center.

NOTE c: Catawba Units 1 and 2 capacity reflects 100% of the station's capability.

NOTE d: WS Lee Combined Cycle (CC) Units CT11, CT12 and ST10 reflects 100% of the CC's capability and does not factor in the 100 MW of capacity owned by NCEMC. The DEC – NCEMC Joint-Owner contract includes an energy buyback provision for DEC of the capacity owned by NCEMC in the WS Lee CC facility.

NOTE e: Solar capacity ratings reflect nameplate capacity.

NOTE f: Lee Unit 3 summer capacity rating reflects nameplace value.

NOTE g: Resource type based on NERC capacity factor classifications which may alternate over the forecast period.

NOTE h: The Catawba units' multiple owners and their effective ownership percentages are:

CATAWBA OWNER	PERCENT OF OWNERSHIP
Duke Energy Carolinas	19.246%
North Carolina Electric Membership Corporation (NCEMC)	30.754%
NCMPA#1	37.5%
PMPA	12.5%

DEC and DEP Nuclear Fleet

		Duke	Synapse	Delta
Brunswick 1	DEP	975	975	-
Brunswick 2	DEP	953	953	-
Catawba 1	DEC	1,199	1,205	6
Catawba 2	DEC	1,180	1,186	6
Harris 1	DEP	1,009	1,009	-
McGuire 1	DEC	1,199	1,199	-
McGuire 2	DEC	1,187	1,187	-
Oconee 1	DEC	865	867	2
Oconee 2	DEC	872	872	-
Oconee 3	DEC	881	881	-
Robinson 2	DEP	793	793	0
	Total	11,113	11,127	14
	DEC	7,383	7,397	14
	DEP	3,730	3,730	0

IRP Modeling of Catawba Joint Owner Capacity Share After Reliability Exchanges*			
NCEMC	584	-	(584)
NCMPA#1	832	-	(832)
PMPA	277	-	(277)
	1,693	-	(1,693)
Nuclear capacity available to serve IRP Load:	9,420	11,127	1,707

Notes:

Source: DEC and DEP 2020 IRPs, Appendix B

* The Catawba ownership percentages shown in the IRP (DEC p.215) apply to Catawba capacity after accounting for reliability exchanges.

The amount by which the Synapse Study overstates nuclear capacity.

Overstated Nuclear Capacity Modeled in the Synapse Study

	Winter Rating (MW)	Duke Share (MW)	Co-Owner's Share (MW)	Total Overstated Nuc Capacity in Synapse Study[1] (MW)
Catawba 1&2	2,379	686	1,693	1,707

Modeling Impacts - Significance of Flawed Assumption (Capacity)

Overstated Nuclear Capacity Modeled in Synapse Study (MW):[1]	1,707
Overstated Nuclear Capacity Equivalency of Robinson Nuc Unit (793 MW):	2.2
Overstated Nuclear Capacity Equivalency of Solar plus Storage (MW):[2]	6,828

Modeling Impacts - Significance of Flawed Assumptions (Energy)

Overstated Nuclear Energy Modeled in Synapse Study (MWh):[3]	14,205,654
Number of Homes Overstated Nuclear Energy in Synapse Study Could Power:[4]	1,183,805
Total DEC and DEP SC Residential Customers (as of March 2021):	665,556

Notes:

[1]Reflects Synapse modeling Co-Owners' Share of Catawba 1&2 and slight differences in unit ratings.

[2]Assumes solar plus 4-hour duration storage, 25% storage to solar ratio and 25% effective load carrying capability (ELCC).

[3]Assumes 1,707 MW and a 95% capacity factor.

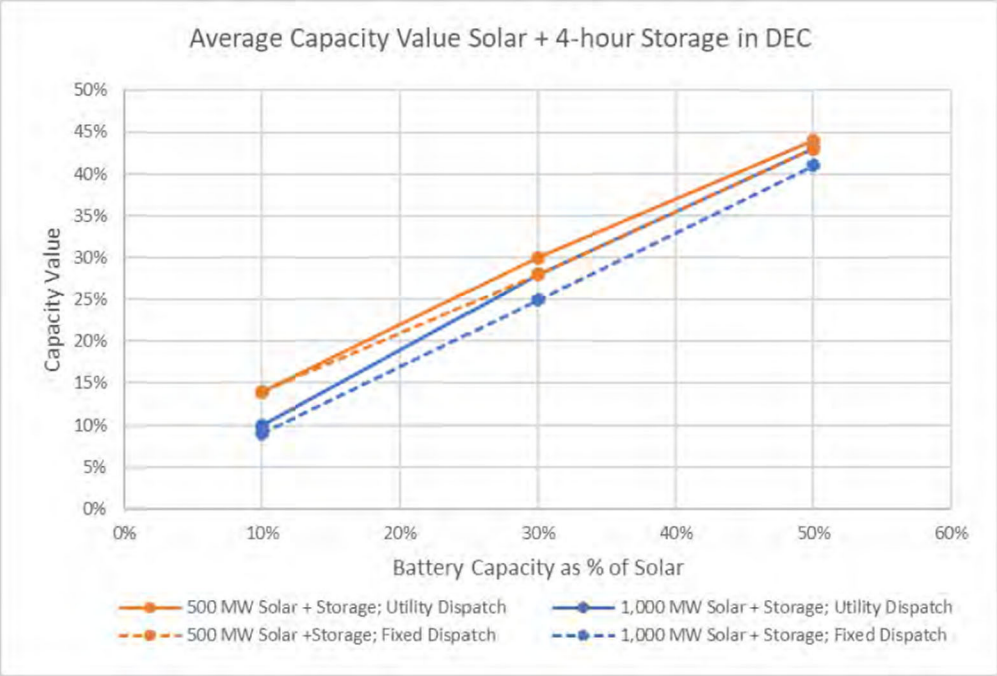
[4]Assumes 1,000 kWh/Mo usage per residential household.

Solar Plus 4-Hour Duration Storage

(DEC 2020 IRP Appendix H, page 353 of 405)

FIGURE H-8

AVERAGE CONTRIBUTION TO DEC WINTER PEAK OF SOLAR PLUS 4-HOUR DURATION STORAGE



Storage to solar ratio	25%
ELCC for Solar+Storage used in IRP	25%
Overstated winter CNS Capacity	1707
Solar + storage MW required to replace overstated Catawba capacity (MW)	**6,828**